

<b>Daily Instructional Plan</b>		<b>Instructor:</b>	
<b>Lesson Title:</b>	Best Management Practices and Irrigation		
<b>Unit:</b>	Irrigation		
<b>Course:</b>	Horticulture 2		
<b>Estimated Time:</b>	2 – 45-50 minute class periods		
<b>Student Performance Standards (SPSs):</b>		<b>Sunshine State Standards:</b>	
18.01 Identify and apply Best Management Practices to reduce pollution and conserve water.		SC.912.L.17.9, 11, 12; MA.912.G.2.7; MA.912.A.10.2	
<b>Making Connections</b>			
<b>FCAT</b>		<b>FFA</b>	
Students will use the Prediction Chart to review reading concepts learned by reading. Prediction Thinking gets the student interested in reading into the material and gets them engaged. Reading FCAT is tested annually.		Best Management Practices are incorporated into the written exams for Floriculture and Nursery/Landscape Career Development Events.	
<b>BMP</b>		<b>FCHP</b>	
The use of irrigation best management practices promotes proper irrigation design, construction and management. This leads to reduced water use, the protection of aquatic sources, better plant development, economic savings to the end user, and efficient fertilizer use.		FCHP is recognized as compliant with Best Management Practices and links directly to the GI-BMPs.	

## Student Learning Objectives

*Students will be able to:*

1. Identify water needs of plants by observing and listing visual indications of water stress.
2. Describe methods of measuring water output in an irrigation system.
3. Explain Best Management Practices as it applies to Irrigation.
4. Identify tools and equipment used in irrigation systems.

## Materials and Equipment

- Overhead Projector
- Access to the internet or download the Florida Green Industries Best Management Practice for Protection of Water Resources in Florida. Chapter 1 and Chapter 3 Go to : <http://hort.ufl.edu/bmp/turfBMP.pdf>
- Access to outside school- irrigation system.
- 5 Gallon Bucket
- Catch Cans to test Irrigation System.
- Student Prediction Thinking Strategies Worksheet.
- Timer or stopwatch
- Irrigation system parts: micro drip emitters, spray jets, risers, backflow valve, irrigation zone timer, etc.
- 20 cans for catching water: Tuna or cat food cans work.

## Vocabulary

**Application rate:** Also known as precipitation rate. The rate at which a sprinkler applies water, usually given in inches per hour (iph).

**Check valve:** A device installed to prevent drainage from sprinklers at lower elevations. Usually installed under the sprinkler, but some sprinklers have this device installed already.

**Flow rate:** The manufacture-designed water discharge rate from a sprinkler, measured in gallons per minute (gpm). A micro-irrigation emitter's flow rate is measured in gallons per hour (gph).

**Rain Sensor:** Also known as a rain shut-off device or rain switch. A device that prevents the sprinkler system from turning on when there has been adequate rainfall. However, it does not interrupt the timekeeping function of a clock.

**Rotary head:** Also known as a rotor. This sprinkler type throws one stream or many streams of water while rotating, with many moving parts. Typically used to water large lawn areas, applying water at a slower rate than a spray head, from 0.1 to 0.3 inches per hour. Spacing in most residential systems is generally 25 to 35 feet.

**Spacing:** The distance between adjacent sprinkler heads.

**Spray head:** A stationary sprinkler head with no moving parts that pops up when water is supplied and down when it stops. Water is applied in a designated spray pattern at a rate from 1.0 to 1.5 inches per hour. Various nozzle types produce different spray patterns. Spacing is generally 3 to 15 feet.

**Time clock:** Also known as a controller or timer. An automatic timing device, connected to a series of electric valves, that turns sprinkler zones on and off according to a schedule set by a contractor or homeowner.

**Valve:** A device that controls the flow of water into a zone. Manual valves, such as a gate or ball valves, need to be opened and closed by hand. Electric valves are wired to a time clock.

**Zone:** A group of sprinklers that operate at the same time and are controlled by a single valve.

## Procedures

### Warm-Up:

1. Bell Ringer: Have students draw a picture of how they look under stress. Next to that picture have students draw a plant under stress. Lead a discussion of what can happen to plants under prolonged periods of stress. What are the indicators?

2. Prediction Thinking: Reading Strategy

### Activity Day: 1

Lesson: Begin with the Pre-Reading Strategy: Prediction Thinking. Have students completed the Prediction Thinking Chart: Teacher should model on how student should be looking at Titles, Subtitles diagrams etc. Have them complete the entire Predictions column before they begin reading. Have them complete one chapter at time and answer the 'Facts' column. Read Chapter 1: Pages 1-5 and complete activity. (They will also need to read Chapter 3). You may need to assign the reading over 2 class periods.

Assign for Homework: Students should also read the Chapter VI in the FNGLA Manual. Have students take the Practice Test after they have reviewed the Power Point. Give students a copy of the Fill-In-Notes.

Display a PowerPoint or get actual irrigation equipment and Supplies: PVC, drip emitters, spray jets, mist heads, risers, sprinklers, backflow valve, filters, etc. You may incorporate this into the Tool Id for the FFA Landscape and Nursery CDE. Enclosed is a PowerPoint of irrigation equipment.

### Activity Day 2:

Catch Can Irrigation Test: Lab Activity:

Divide Students into groups of 3 or 4. They will be testing the flow rate of an irrigation system used in the school yard. If an irrigation system is not available the instructor can set up zones using a simple manual sprinkler. Even though this not ideal students can go through the process of testing application rates of sprinkler heads. Print out one lab sheet for each group of students. Make sure all zones in the system are tested. The instructor must review how to adjust sprinkler heads for flow and direction. The zone timer should be shown to the students to prevent them from deleting the automatic timing. Show them how to turn the zones on manually.

At the end of the test the students should compile the data collected on one chart put on the board or overhead before students answer the results and conclusion section of the lab sheet.

### **Supplies:**

Twenty (20) straight-sided containers of the same size

Ruler  
Stopwatch, watch or kitchen timer  
This record sheet  
A pen or pencil

Students will complete the math for each zone and compare the hourly rate to the chart on the worksheet.

Discuss with students if any adjustments need to be made to the system.

### **Wrap-Up:**

#### **Discussion Questions:**

1. What are Best Management Practices?
2. Explain why the Green Industry needs to understand how we effect the environment?
3. Explain the phrase “Right Plant for the Right Place”.
4. How can you tell if a plant is in stress? What are some of the visual indicators?
5. What will happen to a plant if it remains in stress for a long period of time?
6. Why is it important to check the irrigation system by using the Catch Can Test?

#### **Assessment**

Lab Report: Data collection on Catch Can Test.

#### **ESE and ESOL Modifications**

Visuals: Pictures of irrigation tools.

Peer Tutor: Students are paired together and work together on prediction column of reading strategy.

Problem Solving: Students determine flow rates of an irrigation system by performing a test.

Prediction Thinking

#### **List of Resources**

*Florida Friendly Best Management Practices for Protection of Water Resources by Florida's Green Industries*

*Florida Yards and Neighborhoods Handbook*

*FNGLA Certified Horticulture Professional Manual*

[http://www.tampagov.net/dept\\_water/information\\_resources/Sprinkler\\_Checkup/Irrigation\\_Catch\\_Can\\_Test.asp](http://www.tampagov.net/dept_water/information_resources/Sprinkler_Checkup/Irrigation_Catch_Can_Test.asp)